

Estimate of statistical relationship between the intensity of artificial airglow and ionospheric parameters using the data obtained at the sura facility over the period of 2010 to 2016

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Abstract

© 2019 IEEE. The paper presents statistical analysis results of experimental data obtained via heating experiments in recording artificial ionospheric airglow exposed to powerful short-wave radiation using the Sura facility. The data used in the analysis include the intensity values of optical airglow in the red oxygen line, the difference between the critical frequency of ionosphere and the pump wave frequency, the thickness of plasma resonance regions of ionosphere and the height of reflection of wave trajectories calculated via mathematical modeling. The key result is the detected correlation between the optical airglow magnitude and the difference between the critical frequency of ionosphere and the pump wave frequency. The statistical analysis shows that the interaction of short-wave electromagnetic radiation with the ionosphere is most effective when the difference between the critical frequency of ionosphere and the pump wave frequency ranges from 0 to 1 MHz.

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Keywords

Artificial optical airglow of the ionosphere, Ionospheric plasma, Radio wave propagation, Ray tracing of decameter radio waves, Statistical analysis

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